

ONE NEW SPECIES AND ONE NEW RECORD SPECIES OF THE GENUS *GASTERACANTHA* (ARANEAE, ARANEIDAE) FROM CHINA

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Abstract Two species of the araneid spider genus *Gasteracantha* are reported from the Gaoligong Mountains (Yunnan Province, Southwest China), including a new species: *Gasteracantha aureola* sp. nov., and a known species: *Gasteracantha unguifera* Simon, 1889. *G. unguifera* is first recorded from China and its male is described for the first time. Distributional data and illustrations of somatic and genitalic morphology are provided. The differences between related species are discussed.

Key words Taxonomy, orb-weaving spiders, *Gasteracantha*, new species, China.

1 Introduction

The araneid spider genus *Gasteracantha* Sundevall, 1833 are characteristic by the paired spines on the abdomen and sexual dimorphism. Up to now, 100 species and subspecies are included in this genus (Platnick, 2013) and 5 species recorded in China (Hu, 1984; Feng, 1990; Chen & Gao, 1990; Chen & Zhang, 1991; Zhao, 1993; Yin *et al.*, 1997; Song *et al.*, 1999; Song *et al.*, 2001).

While examining the specimens collected from the Gaoligong Mountains (Yunnan Province, Southwest China) by the Sino-American Expeditions of 1998–2008, three species of *Gasteracantha* were found, including a new species: *G. aureola* sp. nov., and two known species: *G. unguifera* Simon, 1889 and *G. kuhli* C. L. Koch, 1837. The species *G. unguifera* was first recorded from China and the male was found for the first time. In this paper, *G. aureola* sp. nov. and *G. unguifera* Simon, 1889 are described, photographed and drawn. The type materials of *G. aureola* sp. nov. are deposited in College of Life Sciences, Hunan Normal University (China) and some additional specimens will be deposited in the California Academy of Sciences, San Francisco (USA).

2 Material and Methods

Specimens are preserved in 75 % ethanol. Female genitalia were cleared in lactic acid for examination and deposited in microvials together with their bodies. An

Olympus SZX16 stereo microscope was used for specimens' examination. Digital photographs were taken by a Nikon DS-Fil digital camera attached on the Olympus SZX16. Legs are measured under an Olympus SZ11 stereo microscope and given as: total length (femur, patella + tibia, metatarsus, tarsus). All measurements are given in millimeters (mm).

Morphological abbreviations used in the text: ALE: anterior lateral eyes, AME: anterior median eyes, MOA: median ocular area, PLE: posterior lateral eyes, PME: posterior median eyes.

Abbreviations of institutes in the text are: CAS: California Academy of Sciences, KIB: Kunming Institute of Botany, China Academy of Sciences, HNU: Hunan Normal University.

3 Taxonomy

Family Araneidae Clerck, 1757

Genus *Gasteracantha* Sundevall, 1833

3.1 *Gasteracantha aureola* sp. nov. (Figs 1–5)

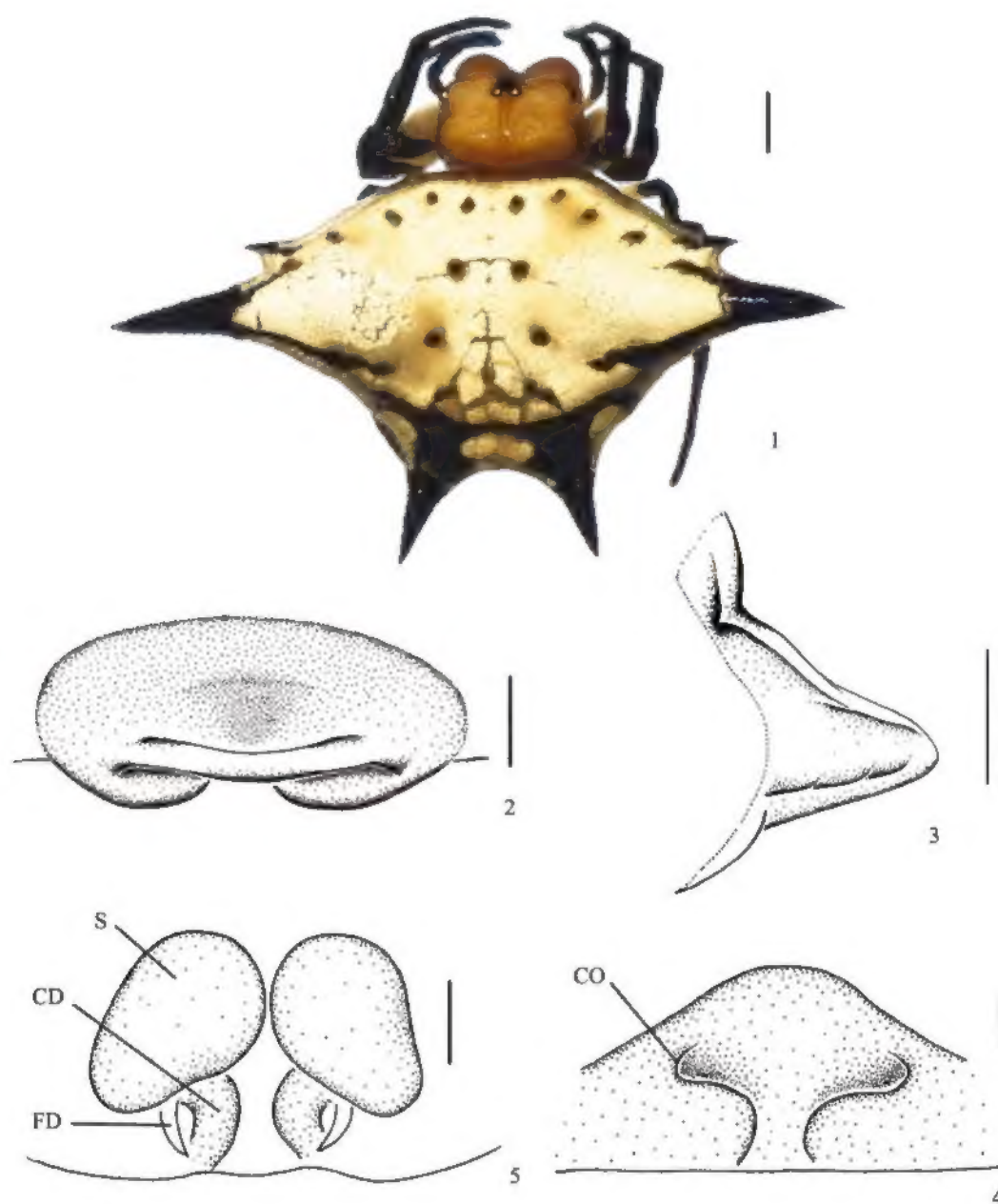
Holotype female, China, Yunnan Province, Gongshan County, Dulongjiang Township, Qinglangdang Village (27.69° N, 98.28° E; alt. 1309 m), 31 Aug. 2006, HU Peng leg., Hu_060831 (HNU). Paratype 1 female, Dulongjiang Township, Maku Village (27.69° N, 98.30° E; alt. 2097 m), 2 Sep. 2006, HU Peng leg., Hu_060902 (HNU).

Etymology. The specific name comes from the Latin

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Figs 1 - 5. *Gasteracantha aureola* sp. nov. 1. Female habitus, dorsal view. 2 - 4. Epigyne. 2. Ventral view. 3. Lateral view. 4. Posterior view. 5. Vulva, dorsal view. CD. Copulatory duct. CO. Copulatory opening. FD. Fertilization duct. S. Spermatheca. Scale bars: 1 = 1 mm, 2 - 4 = 0.1 mm.

word "*aureolus*" (gorgeous), in reference to the bright color of the body.

Diagnosis. This species is similar to *Gasteracantha hasselti* C. L. Koch, 1837 (Tikader, 1982; Yin *et al.*, 1997) in appearance, but can be easily distinguished from the latter by: 1) the copulatory openings S-shaped (square bracket shaped in *G. hasselti*); 2) the spermathecae pyriform (round in *G. hasselti*).

Female (holotype). Total length 7.65. Prosoma 2.40 long, 2.35 wide; ophisthosoma 6.00 long, 12.10 wide. Carapace square, high anteriorly, light orange in coloration (Fig. 1). Sternum peltate, yellowish with grey margins; chelicerae light orange,

with six promarginal and five retromarginal teeth; gnathocoxae and labium light orange too. Legs short, almost black with yellowish femora. Ophisthosoma wider than long, with 3 pairs of black spines laterally and posteriorly, anterior spines weakest, while median spines strongest (Fig. 1). Venter with a sclerotized hump between epigyne and spinnerets. Eye sizes and interdistances: ALE 0.11, PLE 0.11, AME 0.14, PME 0.15; AME-AME 0.11, AME-ALE 0.89, PME-PME 0.18, PME-PL 0.83, MOA 0.36 long with front width 0.35 and back width 0.48. Leg measurements: I 5.95 (1.80, 2.10, 1.30, 0.75), II 5.65 (1.75, 1.95, 1.20, 0.75), III 4.15 (1.35,

1.30, 0.85, 0.65), IV 6.30 (2.10, 2.05, 1.40, 0.75). Epigyne with a very short scape; copulatory openings located posteriorly; copulatory ducts short and twisted; spermathecae pyriform (Figs 2–5).

Male. Unknown.

Variation. Female total length ranges from 7.00 to 7.65.

Distribution. China (Yunnan Province).

3.2 *Gasteracantha unguifera* Simon, 1889 (Figs 6–15)

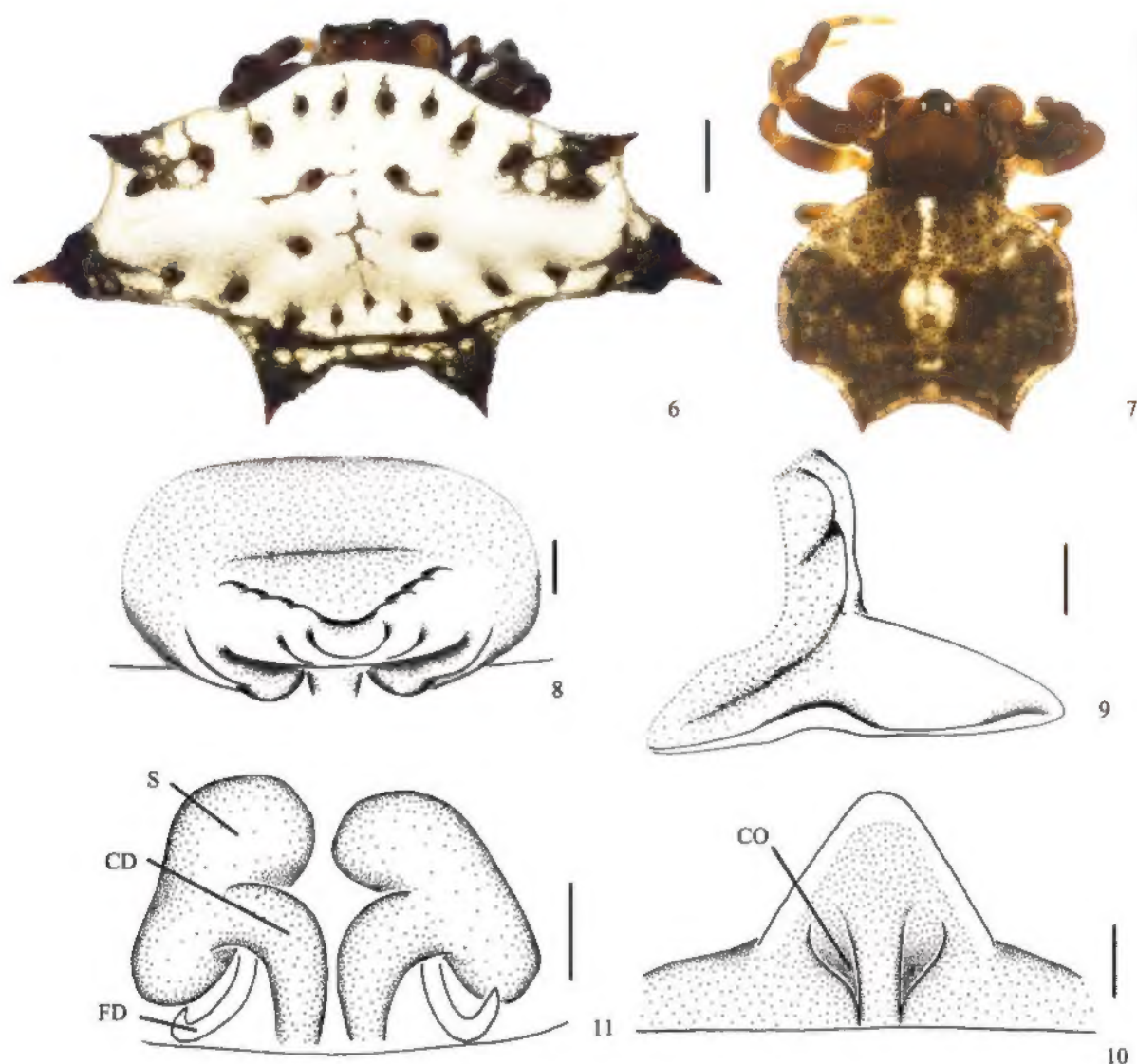
Gasteracantha unguifera Simon, 1889: 336 (♀); Tikader, 1982: 57, figs 115–118 (♀).

Material examined. China, Yunnan Province: 1 male, Gongshan County, Dulongjiang Township, Kongdang (27.88°N, 98.34°E; alt. 1527 m), 25 Oct. 2004, TANG Guo leg., Tang0404 (CAS); 1 female and 3 males, Gongshan County, Dulongjiang Township, Longyuan Village, Bailai Group (28°N, 98.19°E; alt. 1676 m), 31 Oct. – 3 Nov. 2004, TANG Guo leg., Tang0406 (HNU); 1 male, Gongshan County, Dulongjiang Township, Xianjiudang Village (27.56°N, 98.20°E; alt. 1634 m), 4–5 Nov. 2004, TANG Guo leg., Tang0407 (CAS); 1 female and 3 males, Gongshan County, Dulongjiang Township, Mokewang Bridge (27.84°N, 98.32°E, alt. 1455 m), 6–7 Nov. 2004, TANG Guo leg., Tang0408 (HNU); 3 males, Gongshan County, Heiwadi of New Road (27.47°N, 98.36°E; alt. 1850 m), 13–16 Nov. 2004, TANG Guo leg., Tang0412 (CAS); 1 female, Longyang County, Mangkuan Township, Baihualing Village, Zaochang River (25.31°N, 98.79°E; alt. 1625 m), 2 June 2005, KAVANAUGH David, GRISWOLD Charles, DONG Da-Zhi and YAN Heng-Mei leg., 2005-041A (CAS); 2 males, Lushui County, Pianma Township, along the road in town (26.01°N, 98.62°E; alt. 1780 m), 15 May 2005, GUO Ke-Ji leg., GKJ004 (HNU); 2 females, Longyang County, Bawan Township, Ganlin River at Baihua Village (24.84°N, 98.89°E; alt. 700 m), 1 June 2005, YAN Heng-Mei and GUO Ke-Ji leg., GKJ035 (CAS); 1 female and 1 male, Longyang County, Mangkuan Township, Baihualing Village (25.31°N, 98.80°E; alt. 1515 m), 2 June 2005, YAN Heng-Mei and GUO Ke-Ji leg., GKJ037 (HNU); 1 female, Tengchong County, Qushi Township, Heiyuhe landscape (25.22°N, 98.58°E; alt. 1550 m), 2 June 2006, YIN Chang-Min, HU Jia-Fang, YANG Ming-Wei and HE Shao-Xian leg., YHY20 (CAS); 1 female, Tengchong County, Xinhua Township, Longjing Village (25.81°N, 98.56°E; alt. 1940 m), 5 June 2006, YIN Chang-Min, HU Jia-Fang, YANG Ming-Wei and HE Shao-Xian leg., YHY29 (HNU); 1 female, Tengchong County, Jietou Township, Datang Village Daheling Ganjiao (25.63°N,

98.67°E; alt. 1779 m), 18 May 2006, PENG Xian-Jin, WANG Xin-Ping and HU Peng leg., PWH060518 (HNU); 1 female, Gongshan County, Dulongjiang Township, Maku Village (27.69°N, 98.30°E; alt. 1814 m), 28 Aug. 2006, HU Peng leg., Hu_060828 (CAS); 1 female, Gongshan County, Dulongjiang Township, Qinglangdang Village (27.69°N, 98.28°E; alt. 1309 m), 31 Aug. 2006, HU Peng leg., Hu_060831 (CAS); 2 females, Gongshan County, Dulongjiang Township, Qinglangdang Village (27.69°N, 98.28°E; alt. 1309 m), 1 Sep. 2006, HU Peng leg., Hu_060901 (HNU); 1 female and 2 males, Longyang County, Mangkuan Township, Baihualing Village (25.30°N, 98.80°E; alt. 1624 m), 10 Oct. 2007, PENG Xian-Jin leg., 20071010 (CAS).

Diagnosis. This species is similar to *Gasteracantha hasselti* C. L. Koch, 1837 (Yin *et al.*, 1997) in having a membranous terminal apophysis, but can be easily distinguished from the latter by having: 1) the copulatory openings wide and depressed (narrow and split-shaped in *G. hasselti*); 2) the embolus is thick and curved, shorter than the terminal apophysis obviously (the embolus is wirelike distally and as long as the terminal apophysis in *G. hasselti*). And the female of this species is similar to *Gasteracantha diadestia* Thorell, 1887 (Tikader, 1982; Barrion & Litsinger, 1995; Yin *et al.*, 1997) in appearance, but can be easily distinguished from the latter by: the spermathecae kidney-shaped (oval in *G. diadestia*).

Female (Tang0408). Total length 5.5. Prosoma 2.5 long, 1.9 wide; opisthosoma 4.7 long, 10.6 wide. Carapace square, high anteriorly, yellowish brown in cephalic region and brownish gray thoracic region (Fig. 6). Sternum peltate, yellowish with inverse triangle grey marks; chelicerae brown with seven promarginal and four retromarginal teeth; gnathocoxae and labium dust color. Legs short and thick, brown with yellowish annulus. Opisthosoma wider than long, with 3 pairs of black spines laterally and posteriorly, median spines largest while posterior spines slightly larger anterior posterior spines; dorsum provided with 23 conspicuous sigilla (Fig. 6). Venter with a sclerotized hump between epigyne and spinnerets. Eye sizes and interdistances: ALE 0.09, PLE 0.09, AME 0.11, PME 0.13; AME-AME 0.11, AME-ALE 0.63, PME-PME 0.23, PME-PL 0.65, MOA 0.35 long with front width 0.33 and back width 0.45. Leg measurements: I 4.55 (1.50, 1.60, 0.80, 0.65), II 4.25 (1.45, 1.45, 0.75, 0.60), III 3.05 (1.05, 0.90, 0.55, 0.55), IV 4.70 (1.65, 1.45, 0.95, 0.65). Epigyne with a triangular scape; copulatory openings depressed, located posteriorly; copulatory ducts short and twisted; spermathecae kidney-shaped (Figs 8–11).



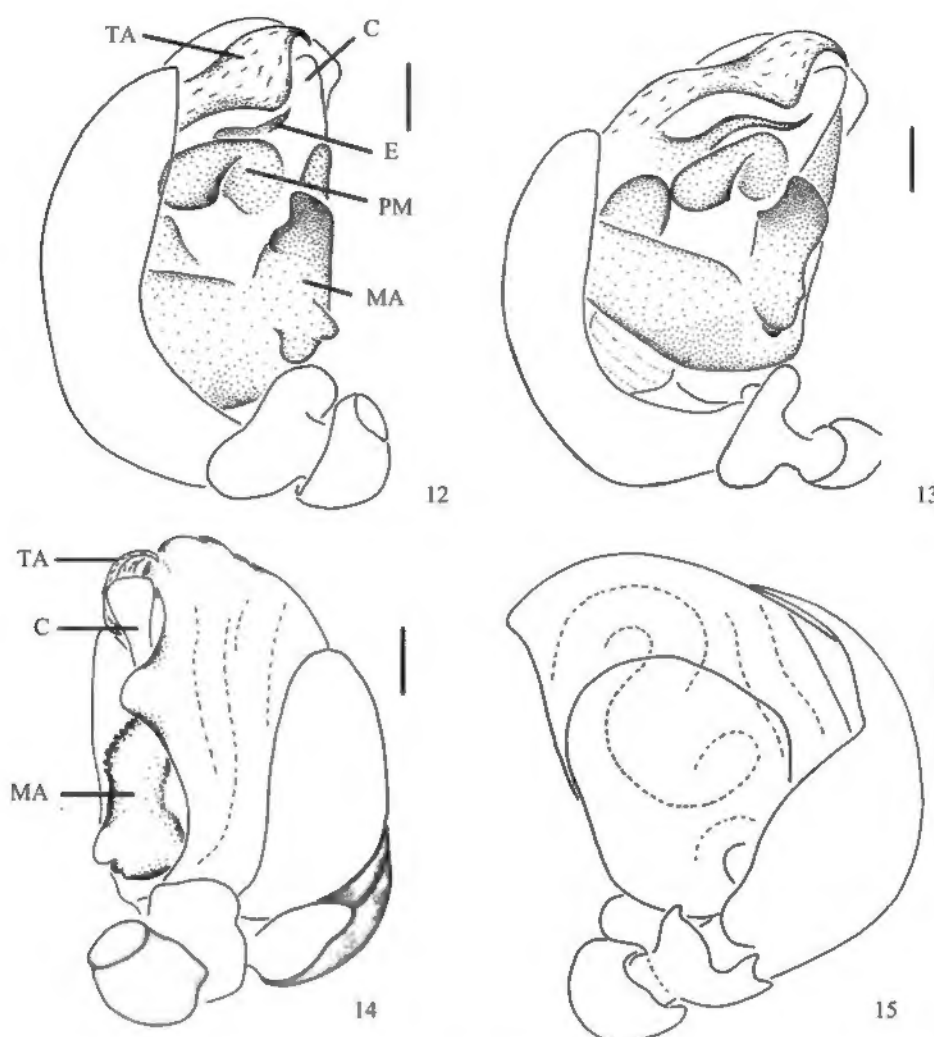
Figs 6 - 11. *Gasteracantha unguifera* Simon, 1889. 6. Female. 7. Male. 8 - 10. Epigyne. 8. Ventral view. 9. Lateral view. 10. Posterior view. 11. Vulva, dorsal view. CD. Copulatory duct. CO. Copulatory opening. FD. Fertilization duct. S. Spermatheca. Scale bars: 6 - 7 = 1.0 mm, 8 - 11 = 0.1 mm.

Male (Tang0408). Total length 2.20. Prosoma 0.95 long, 0.95 wide; ophisthosoma 1.50 long, 1.95 wide. Carapace square, high anteriorly, yellowish brown in cephalic region and brownish gray thoracic region (Fig. 7). Sternum peltate, yellowish with inverse triangle grey marks; chelicerae brown with seven promarginal and four retromarginal teeth; gnathocoxae and labium dust color. Legs short and thick, brown with yellowish annulus. Ophisthosoma with only a pair of conspicuous spines posteriorly (Fig. 7). Eye sizes and interdistances: ALE 0.07, PLE 0.07, AME 0.08, PME 0.08; AME-AME 0.04, AME-ALE 0.21, PME-PME 0.10, PME-PLP 0.21, MOA 0.20 long with front width 0.19 and back

width 0.24. Leg measurements: I 2.05 (0.70, 0.70, 0.35, 0.30), II 1.95 (0.70, 0.65, 0.30, 0.30), III 1.40 (0.45, 0.45, 0.25, 0.25), IV 1.85 (0.65, 0.60, 0.35, 0.25). Pedipalp with a small paracymbium; median apophysis large with lobes; paramedian apophysis present, kidney-shaped and depressed at the middle part; conductor small; embolus thick and curved, terminal apophysis long, membranous (Figs 12 - 15).

Variation. Female total length ranges from 5.35 to 5.60; the color of dorsal abdomen of females varies from white to almost black. Male total length ranges from 2.05 to 2.20.

Distribution. China (Yunnan Province), India.



Figs 12 – 15. *Gasteracantha unguifera* Simon, 1889., left pedipalp. 12. Prolateral view. 13. Prolateral view, expanded. 14. Ventral view. 15. Retrolateral view. C. Conductor. E. Embolus. MA. Median apophysis. PM. Paramedian apophysis. TA. Terminal apophysis. Scale bars = 0.1 mm.

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REFERENCES

- Barrión, A. T. and Litsinger, J. A. 1990. *Riceland Spiders of South and Southeast Asia*. CAB International, Wallingford, UK. xi + 700 pp.
- Chen, X-E and Gao, J-C 1990. *The Sichuan Farmland Spiders in China*. Sichuan Science and Technology Publishing House, Chengdu. 226 pp.
- Chen, Z-F and Zhang, Z-H 1991. *Fauna of Zhejiang: Araneida*. Zhejiang Science and Technology Publishing House, Hangzhou. 356 pp.
- Feng, Z-Q 1990. *Spiders of China in Colour*. Hunan Science and Technology Publishing House, Changsha. 256 pp.
- Hu, J-L 1984. *The Chinese Spiders Collected from the Fields and the Forests*. Tianjin Press of Science and Techniques, Tianjin. 482 pp.
- Platnick, N. I. 2013. *The World Spider Catalog, Version 13.5*. American Museum of Natural History, online at <http://research.amnh.org/iz/spiders/catalog/ARANEIDAE.html> (accessed: 28 Jan. 2013).
- Simon, E. 1889. *Arachnides de l'Himalaya, recueillis par MM. Oldham et Wood-Mason, et faisant partie des collections de l'Indian Museum. Première partie. Journal of the Asiatic Society of Bengal*, 58: 334 – 344.
- Tikader, B. K. 1982. Family Araneidae (= Argiopidae), typical orbweavers. *Fauna India (Araneae)*, 2: 1 – 293.
- Yin, C-M, Wang, J-F, Zhu, M-S, Xie, L-P, Peng, X-J and Bao, Y-H 1997. *Fauna Sinica: Arachnida: Araneae: Araneidae*. Science Press, Beijing. 460 pp.
- Song, D-X, Zhu, M-S and Chen, J 1999. *The Spiders of China*. Hebei Science and Technology Publishing House, Shijiazhuang. 640 pp.

Song, D-X, Zhu, M-S and Chen, J 2001. The Fauna of Hebei, China: Araneae. Hebei Science and Technology Publishing House, Shijiazhuang. 510 pp.

Zhao, J-Z 1993. Spiders in the Cotton Fields in China. Wuhan Publishing House, Wuhan. 552 pp.

中国棘腹蛛属一新种及一新纪录种记述 (蜘蛛目, 园蛛科)

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摘要 记述了采自云南高黎贡山的园蛛科棘腹蛛属 1 新种和 1 新纪录种, 华丽棘腹蛛 *Gasteracantha aureola* sp. nov. 和北棘腹蛛 *Gasteracantha unguifera* Simon, 1889。模式标本保存在湖南师范大学。

华丽棘腹蛛, 新种 *Gasteracantha aureola* sp. nov. (图 1~5)

鉴别特征 新种与哈氏棘腹蛛 *Gasteracantha hasselti* C. L. Koch, 1837 的外形较为相似, 它们的区别为: 前者的交媾孔呈 S 状, 后者的呈方括弧状; 前者的纳精囊为梨形, 后者为球形。

正模 ♀, 云南省贡山县独龙江乡钦郎当村 (27.69°N, 98.28°E; 海拔 1309 m), 2006 年 8 月 31 日, 胡鹏采。副模 1

关键词 分类学, 园蛛, 棘腹蛛属, 新种, 中国。

中图分类号 Q959.226

♀, 云南省贡山县独龙江乡马库村 (27.69°N, 98.30°E; 海拔 2097 m), 2006 年 9 月 2 日, 胡鹏采。

词源: 新种种名源自拉丁词 “*aureola*”, 指其华丽的色彩, 形容词。

北棘腹蛛 *Gasteracantha unguifera* Simon, 1889 (图 6~15)

鉴别特征 本种的触肢器与哈氏棘腹蛛 *Gasteracantha hasselti* C. L. Koch, 1837 的较为相似, 它们的区别为: 前者的交媾孔为 1 对宽的凹陷, 后者为裂缝状; 前者触肢器的插入器粗壮且弯曲, 后者的插入器末端纤细。本种的雌蛛与菱棘腹蛛 *Gasteracantha diadema* Thorell, 1887 的外形较为相似, 它们的区别为: 前者的纳精囊呈肾形, 后者为卵圆形。

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